

---

# A Reconsideration of the Genus *Eurycarpus* (Brassicaceae)

Ihsan A. Al-Shehbaz

Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166-0299, U.S.A.

Yang Guang

Piroche Plants, Inc., 20542 McNeil Road, Pitt Meadows, B.C., Canada V3Y 1Z1

---

**ABSTRACT.** The Himalayan (Tibet and adjacent Kashmir) endemic *Eurycarpus* is recognized, and the characters separating its two species from *Christolea*, *Desideria*, and *Parrya* are discussed. The new combination *E. marinellii* is proposed, and *Christolea longmucoensis* is reduced to synonymy of *E. marinellii*.

In establishing the genus *Eurycarpus*, Botschantsev (1955) separated it from what was then the invalidly published genus *Ermania* Chamisso by the biseriate instead of uniseriate seeds, broadly lanceolate instead of linear fruits, entire instead of dentate leaves, and leafless instead of leafy scapes. However, he probably compared only the type species of both genera because most of these alleged differences do not hold if one compares *Eurycarpus* with the ten species that Botschantsev recognized in *Ermania*. Eight of the ten species of *Ermania* are presently assigned to *Desideria* Pampanini, and the remaining two, including the type of *Ermania*, belong to the earlier published *Melanidion* E. L. Greene. For a discussion on the invalidity of *Ermania* and the generic limits of *Desideria* and *Melanidion*, see Al-Shehbaz (2000).

Although the type species of *Eurycarpus* was originally described in *Parrya* R. Brown, the two genera are unrelated. *Eurycarpus* has at least some of the trichomes forked, nonsaccate lateral sepals, terete replums, wingless seeds, and entire stigmas, and it lacks the multicellular glands. By contrast, *Parrya* has exclusively simple trichomes or the plants are glabrous, strongly saccate lateral sepals, flattened replums, winged seeds, prominently 2-lobed stigmas with decurrent, connivent lobes, and often multicellular glands.

*Desideria* differs from *Eurycarpus* by having dentate, often palmately veined leaves, prominently veined valves with well-developed marginal veins, linear to linear-lanceolate fruits rectangular in cross section, valve apices persistently united with replum, obsolete styles, and 2-lobed stigmas. *Eurycarpus* has entire, pinnately veined leaves, ob-

scurely veined valves without marginal veins, oblong, elliptic, ovate-oblong, or ovate-lanceolate fruits narrowly elliptic in cross section, valve apices readily free from the replum at dehiscence, well-defined subconical styles, and minute, entire stigmas.

Jafri (1955) adopted a very broad generic concept of *Christolea* that included species presently assigned to six genera (Al-Shehbaz, 2000). He transferred *Parrya lanuginosa* J. D. Hooker & Thomson to *Christolea*, a species that Botschantsev (1955) designated as the type of *Eurycarpus*. Jafri's account was followed rather closely by An (1987) and Kuan (1985). *Eurycarpus* is readily distinguished from *Christolea* by having well-defined rosettes, entire basal leaves, leafless stems, stalked-forked trichomes mixed with simple ones, biseriate seeds, obtuse anthers, basally dilated staminal filaments, slightly elongated infructescences, and obscurely veined valves. *Christolea* lacks the basal leaves and rosettes, and it has dentate leaves, leafy stems, exclusively simple trichomes, uniseriate seeds, apiculate anthers, basally slender staminal filaments, considerably elongated infructescences, and prominently veined valves. In our opinion, these differences are significant, and they clearly support the recognition of *Eurycarpus* as a genus distinct from *Christolea*.

***Eurycarpus*** Botschantsev, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 17: 172. 1955. TYPE: *Eurycarpus lanuginosus* (J. D. Hooker & Thomson) Botschantsev.

Herbs perennial, woolly to pilose; caudex slender, few branched. Trichomes simple mixed with stalked 1- to 3-forked ones. Stems erect, simple from rosette. Basal leaves petiolate, rosulate, simple, entire. Stem leaves absent. Racemes several to many flowered, ebracteate, corymbose, elongated slightly in fruit. Fruiting pedicels slender, divaricate. Sepals oblong, deciduous, base of inner pair not saccate, margin membranous. Petals purple; blade spatulate, apex obtuse; claw subequaling se-



pals. Stamens 6, tetradynamous; filaments dilated at base; anthers oblong, not apiculate at apex. Nectar glands 1, confluent and subtending bases of all stamens; median nectaries present. Ovules 8 to 20 per ovary. Fruit dehiscent silicles, oblong, elliptic, ovate-oblong, or ovate-lanceolate, strongly latiseptate, sessile; valves obscurely veined, glabrous, smooth; replum rounded, visible; septum complete or reduced to a rim, membranous, translucent; style to 0.5 mm long, subconical; stigma capitate, entire, minute. Seeds biseriate, wingless, oblong, plump or slightly flattened; seed coat minutely reticulate, not mucilaginous when wetted; cotyledons incumbent or accumbent.

Two species: endemic to China (Tibet) and adjacent Kashmir.

KEY TO THE SPECIES OF *EURYCARPUS*

- 1a. Leaves lanuginose; fruits oblong-ovate to ovate-lanceolate; septum reduced to a rim; cotyledons accumbent . . . . . 1. *E. lanuginosus*  
1b. Leaves pilose; fruits elliptic to oblong, rarely ovate-elliptic; septum complete; cotyledons incumbent . . . . . 2. *E. marinellii*

**1. *Eurycarpus lanuginosus*** (J. D. Hooker & Thomson) Botschantsev, Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 17: 172. 1955. *Parrya lanuginosa* J. D. Hooker & Thomson, J. Linn. Soc., Bot. 5: 136. 1861. *Christolea lanuginosa* (J. D. Hooker & Thomson) Ovczinnikov, Sovetsk. Bot. 1941(1 & 2): 151. 1941. *Ermania lanuginosa* (J. D. Hooker & Thomson) O. E. Schulz, Repert. Sp. Nov. Regni Veg. 28: 185. 1933. *Christolea lanuginosa* (J. D. Hooker & Thomson) Jafri, Notes Roy. Bot. Gard. Edinburgh 22: 52. 1955. TYPE: China. Tibet [Xizang]: Lanjar, 17,500 ft., R. Strachey & J. E. Winterbottom 7 (holotype, K; isotypes, BM, GH, K).

*Draba lanjarica* (as *lanjarica*) O. E. Schulz, Repert. Sp. Nov. Regni Veg. 33: 109. 1935. TYPE: same as that of *Parrya lanuginosa* (holotype, BM).

Herbs 3–5 cm tall; caudex slender, few branched. Trichomes simple, to 1 mm long, mixed with distinctly stalked 1- to 3-forked ones. Stems densely villous. Basal leaves rosulate, fleshy; petiole 2–7 mm long, persistent, becoming papery; leaf blade suborbicular to spatulate to oblong-obovate, 5–10 × 2–6 mm, sublanate with forked trichomes, base cuneate, margin entire, apex obtuse to rounded. Stem leaves absent. Racemes 8- to 15-flowered, ebracteate. Fruiting pedicels divaricate, straight, 4–7 mm long, densely villous. Sepals oblong, 2–2.5 × 1–1.5 mm, pilose. Petals spatulate, ca. 5 × 2.5

mm, apex obtuse; claw ca. 2 mm long. Filaments of median stamens ca. 3 mm long, those of lateral stamens ca. 2 mm long; anthers oblong, ca. 0.6 mm long. Ovules ca. 8 per ovary. Fruit oblong-ovate to ovate-lanceolate, 1.5–2.7 cm × 6–10 mm, strongly flattened; valves glabrous, smooth, with obscure midvein and marginal veins, obtuse at base, acute at apex; septum perforate, reduced to a rim; style subconical, 0.2–0.4 mm long; stigma minute, entire. Seeds biseriate, narrowly oblong, flattened, 2–2.5 × 1–1.3 mm; cotyledons accumbent.

Slopes; 5100–5300 m. China (Xizang).

Schulz (1935) overlooked the fact that his *Draba lanjarica* is based on the same type collection as *Parrya lanuginosa*, a species that he (Schulz, 1933) transferred earlier to the invalidly published *Ermania*. It is interesting to note that Schulz (1936) placed the same species in two genera of two different tribes. He placed *Draba* in the tribe Drabeae and *Ermania* in the tribe Arabideae, and he separated these tribes solely on the basis of having silicles in the Drabeae and siliques in the Arabideae. However, all students of the Brassicaceae readily admit that this distinction in fruit morphology is entirely artificial.

Jafri's (1955) new combination *Christolea lanuginosa* is invalid because it was proposed earlier by Ovczinnikov (1941). Jafri (1973) suggested that *Eurycarpus lanuginosus* (as *Christolea*) is probably conspecific with *C. pumila* (Kurz) Jafri and *Ermania koelzii* O. E. Schulz. That the last two species are conspecific is correct, but as indicated by Al-Shehbaz (2000), they both belong to *Desideria pumila* (Kurz) Al-Shehbaz, a species clearly unrelated to *E. lanuginosus*.

*Other specimens examined.* CHINA. **Xizang:** Zhada Xian, Northwest Institute of Biology Xizang Expedition 3916 (HNWP).

**2. *Eurycarpus marinellii*** (Pampanini) Al-Shehbaz & G. Yang, comb. nov. Basionym: *Braya marinellii* Pampanini, Bull. Soc. Bot. Ital. 1915: 29. 1915. TYPE: [Kashmir.] Karakorum, 5200 m, 27 June 1914, G. Danielli & O. Marinelli s.n. (holotype, FI).

*Christolea longmucoensis* Y. H. Wu & Z. X. An, Acta Phytotax. Sin. 32: 579. 1994. Syn. nov. TYPE: China. Xizang: Rutog, Longmu Co, 5380 m, 2 Sep. 1987, Karakorum-Kunlun Expedition 1302 (holotype, HNWP, listed originally as NWBI; isotypes, KUN, PE).

Herbs 3–10 cm tall, pilose; caudex slender, few branched. Trichomes simple, to 1 mm long, mixed with distinctly stalked 1-forked ones. Stems pilose.



Basal leaves rosulate, subfleshy; petiole (1–)3–10(–14) mm long, persistent, becoming papery; leaf blade spatulate to oblanceolate, rarely obovate, (2–)3–12(–15) × (1–)2–8 mm, pilose with simple and forked stalked trichomes, base cuneate, margin entire, apex obtuse to rounded. Stem leaves absent. Racemes (5 to)10- to 22-flowered, ebracteate. Fruiting pedicels divaricate, straight, 4–8(–10) mm long, pilose. Sepals oblong, 2.2–3 × 1–1.5 mm, sparsely pilose. Petals purplish, spatulate, 5–6 × 2–2.5 mm, apex obtuse; claw ca. 2 mm long. Filaments of median stamens 2.5–3.5 mm long, those of lateral stamens 1.5–2.5 mm long; anthers oblong, 0.5–0.6 mm long. Ovules 12 to 20 per ovary. Fruit elliptic to oblong, rarely ovate-elliptic, (0.7–)1–1.7(–2) cm × (4–)5–7 mm, strongly flattened; valves often purplish, glabrous, smooth, with obscure midvein and marginal veins, subacute at both ends; septum complete; style subconical, 0.2–0.5 mm long; stigma minute, entire. Seeds biseriate, narrowly oblong, not flattened, 2–2.5 × 0.8–0.9 mm; cotyledons incumbent.

Alpine areas; 5300–5700 m. China (Xizang), Kashmir.

In his account of *Braya* Sternberg & Hoppe, Schulz (1924) excluded *B. marinellii* Pampanini and did not assign it to another genus. Three years later, he (Schulz, 1927) transferred the species to *Draba* L. It appears that he never examined the type of this species because he (Schulz, 1933) cited two of the collections above, *Pike 832* and *Thorold 34*, as *Ermania lanuginosa*, whereas Jafri (1973) cited them as *Christolea lanuginosa*. Evidently, Schulz and Jafri failed to distinguish *Eurycarpus marinellii* from *E. lanuginosus*. The latter is readily distinguished by having woolly leaves, oblong-ovate to ovate-lanceolate fruits, perforated septum reduced to a rim, and accumbent cotyledons. *Eurycarpus marinellii* has pilose leaves, elliptic to oblong or rarely ovate-elliptic fruits, complete septum, and incumbent cotyledons.

The original description and illustration of *Christolea longmucoensis* (Wu & An, 1994) include several inaccuracies. The leaf trichomes were illustrated and described as stellate and forked. An examination of the type collection and the others cited below reveals that the leaves have simple and once-forked trichomes. The fruit valve was shown to be with a prominent midvein when in fact it is obscurely veined. Although the cotyledons were

correctly illustrated as incumbent, they were described as accumbent. Finally, these authors cited only the type collection, which has no flowers. The description of the sepals as 5–6 mm long is also inaccurate. Wu and An (1994) compared *Christolea longmucoensis* with *C. stewartii*, but the latter species belongs to the unrelated *Desideria* (Al-Shehbaz, 2000).

*Other specimens examined.* CHINA. **Xizang:** Rutog, Guliya, *Li Bosheng & Zheng Du 10975* (PE); Longmucuo Xian, *Qinghai-Xizang Team 13616* (MO, PE); Ritu Xian, Duoma, *Qinghai-Xizang Team 76-9060* (KUN); E of Horpa Tsu, *Pike 832* (K); without locality, *Thorold 34* (K).

*Acknowledgments.* We are grateful to Zhu Guanghua and Song Hong for their help in the translation of Chinese herbarium labels and to Tatyana Shulkina for help with the Russian literature. We thank the directors and curators of the herbaria cited in this paper.

#### Literature Cited

- Al-Shehbaz, I. A. 2000. A review of gamosepaly in the Brassicaceae and a revision of *Desideria*, with a critical evaluation of related genera. *Ann. Missouri Bot. Gard.* 87: 549–563.
- An, Z. X. 1987. *Christolea*. In: T. Y. Cheo (editor), *Fl. Reipubl. Popularis Sin.* 33: 289–299. Science Press, Beijing.
- Botschantsev, V. 1955. De Cruciferis notae criticae. *Bot. Mater. Gerb. Inst. Komarova Akad. Nauk S.S.S.R.* 17: 160–178.
- Jafri, S. M. H. 1955. *Christolea*: With special reference to the species in N.W. Himalayas, W. Pakistan and Afghanistan. *Notes Roy. Bot. Gard. Edinburgh* 22: 49–59.
- . 1973. Brassicaceae. In: E. Nasir & S. I. Ali (editors), *Fl. West Pakistan* 55: 1–308. Ferozsons, Karachi.
- Kuan, K. C. 1985. Cruciferae. In: C. Y. Wu (editor), *Fl. Xizang*. 2: 323–411. Science Press, Beijing.
- Ovczinnikov, P. N. 1941. *Sibbaldia tetrandra* Bge., on the problem of the origin of cryophil vegetation in Central Asia. *Sovetsk. Bot.* 1941(1 & 2): 145–152.
- Schulz, O. E. 1924. Cruciferae-Sisymbrieae. In: A. Engler (editor), *Pflanzenreich IV*. 105 (Heft 86): 1–388. Wilhelm Engelmann, Leipzig.
- . 1927. Cruciferae—*Draba* et *Erophila*. In: A. Engler (editor), *Pflanzenreich IV*. 105 (Heft 89): 1–396. Wilhelm Engelmann, Leipzig.
- . 1933. Über verschiedene Cruciferen. *Repert. Sp. Nov. Regni Veg.* 33: 183–191.
- . 1935. Neue Cruciferen-Arten. II. *Repert. Spec. Nov. Regni Veg.* 38: 108–109.
- . 1936. Cruciferae. In: A. Engler & K. Prantl (editors), *Nat. Pflanzenfam.*, ed. 2., 17B: 227–658. Verlag von Wilhelm Engelmann, Leipzig.
- Wu, Y. H. & Z. X. An. 1994. Two new species of Chinese *Christolea*. *Acta Phytotax. Sin.* 32: 577–580.